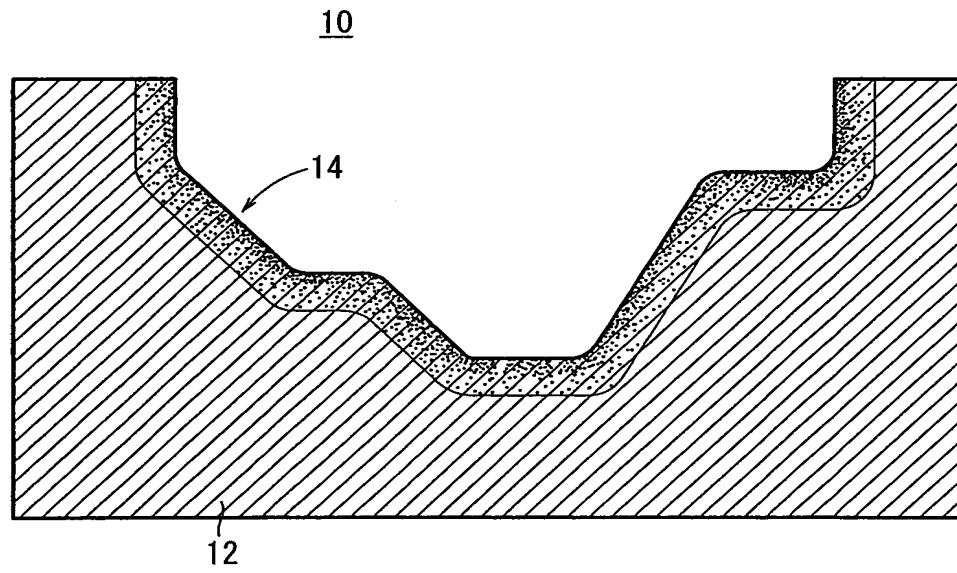
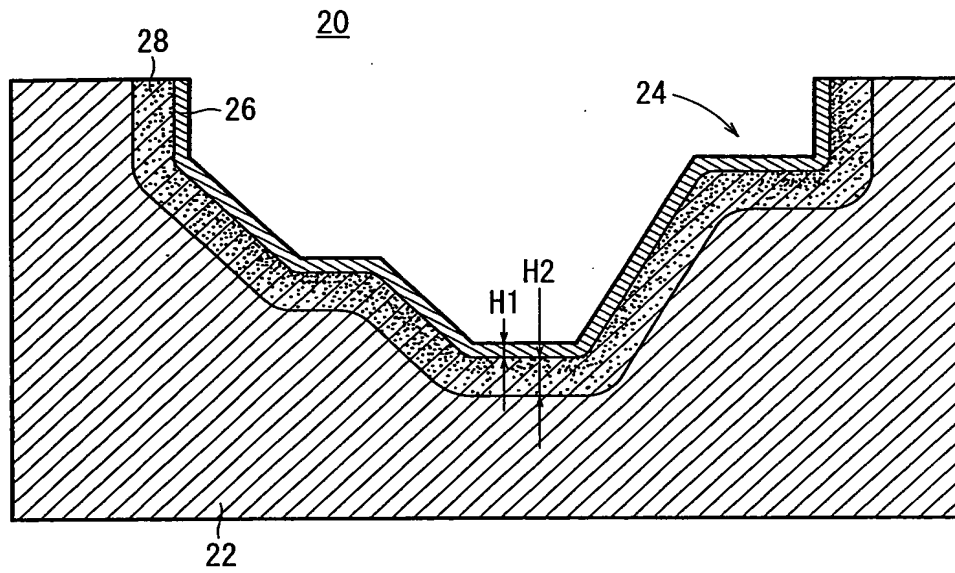


FIG. 1



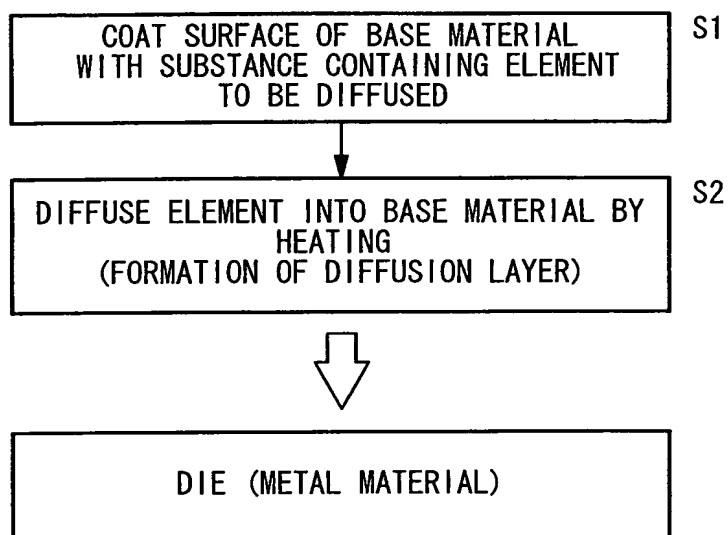
2/15

FIG. 2



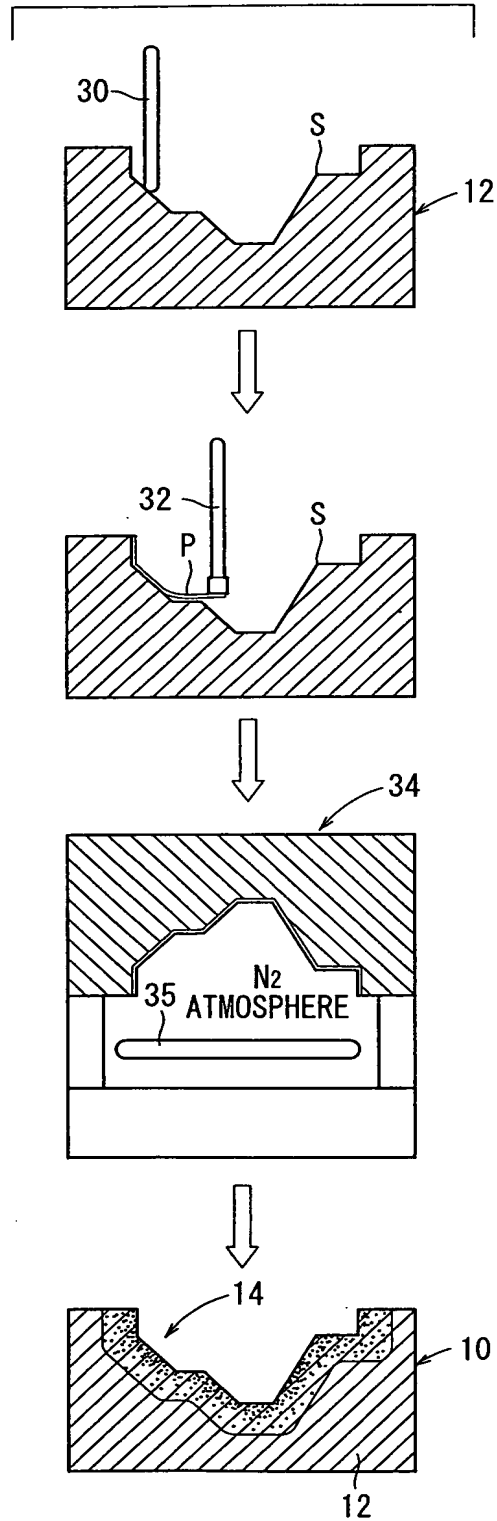
3/15

FIG. 3



4/15

FIG. 4



5/15

FIG. 5

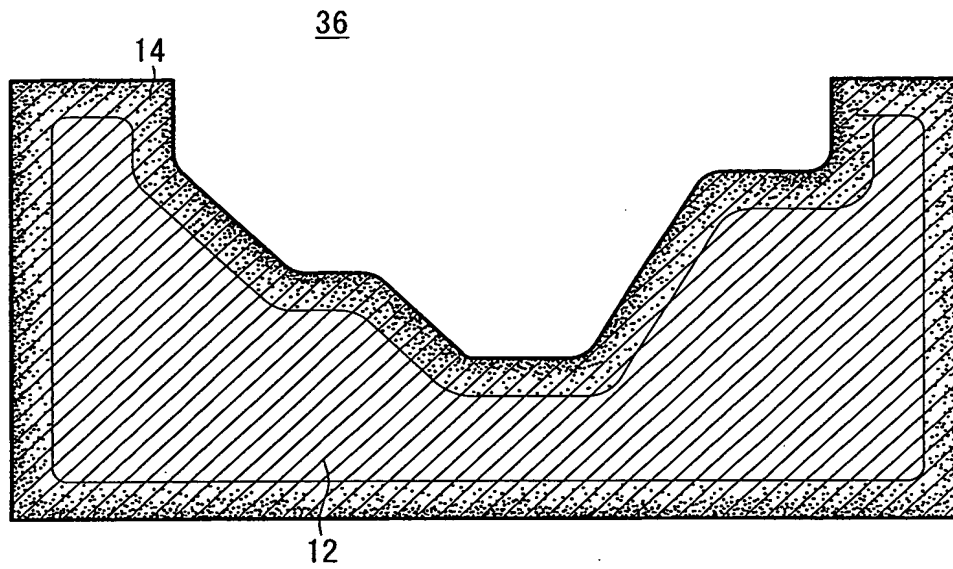
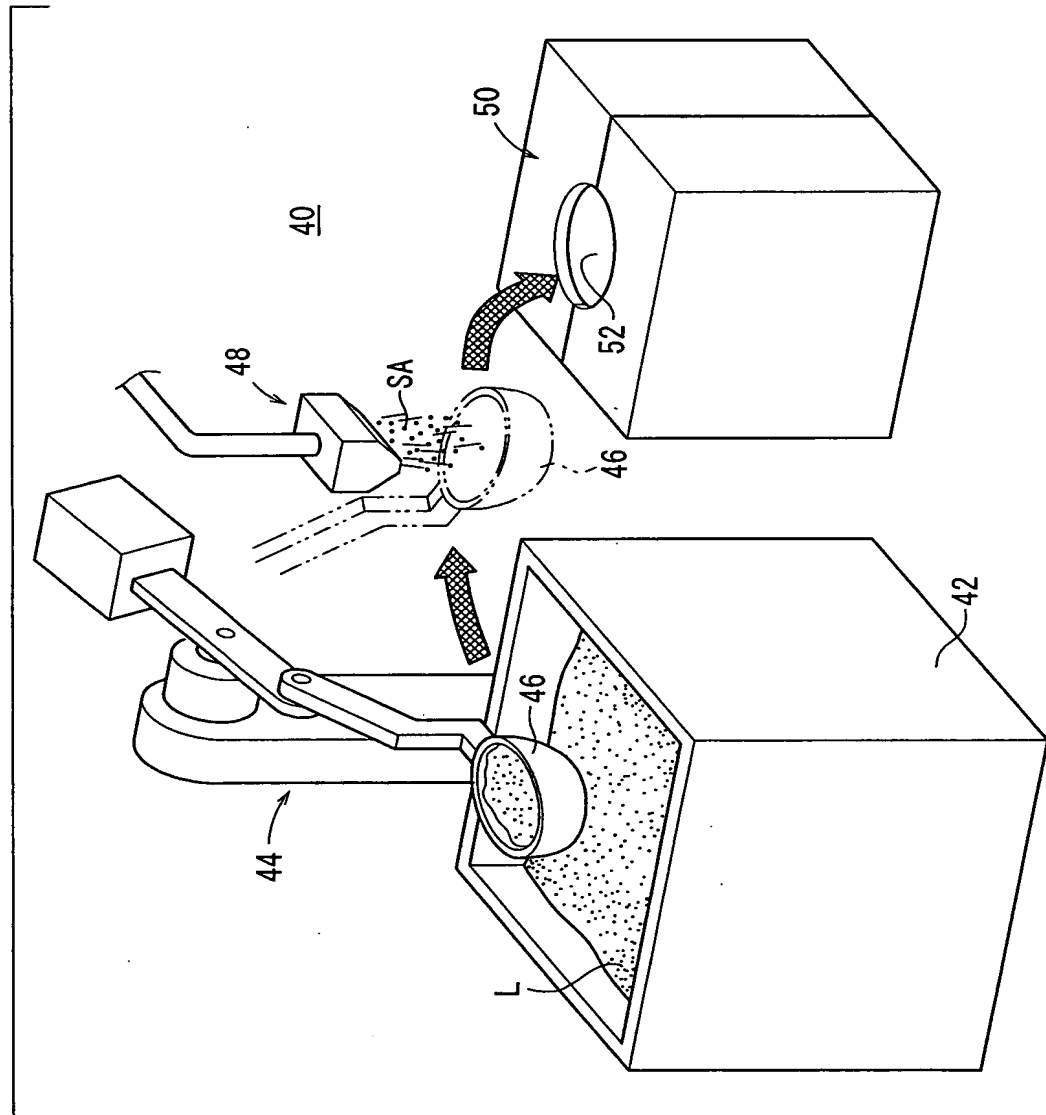
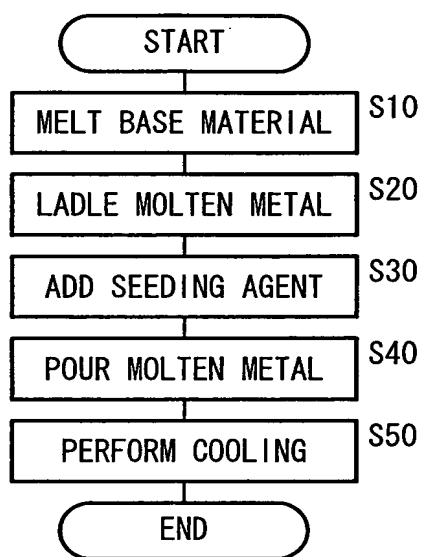


FIG. 6



7/15

FIG. 7



8/15

FIG. 8

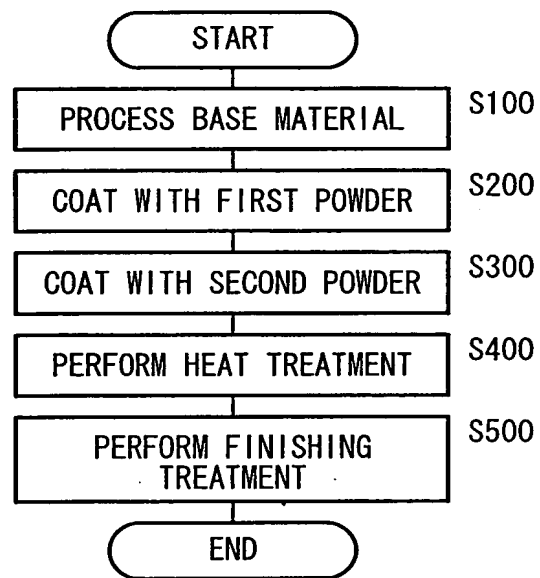
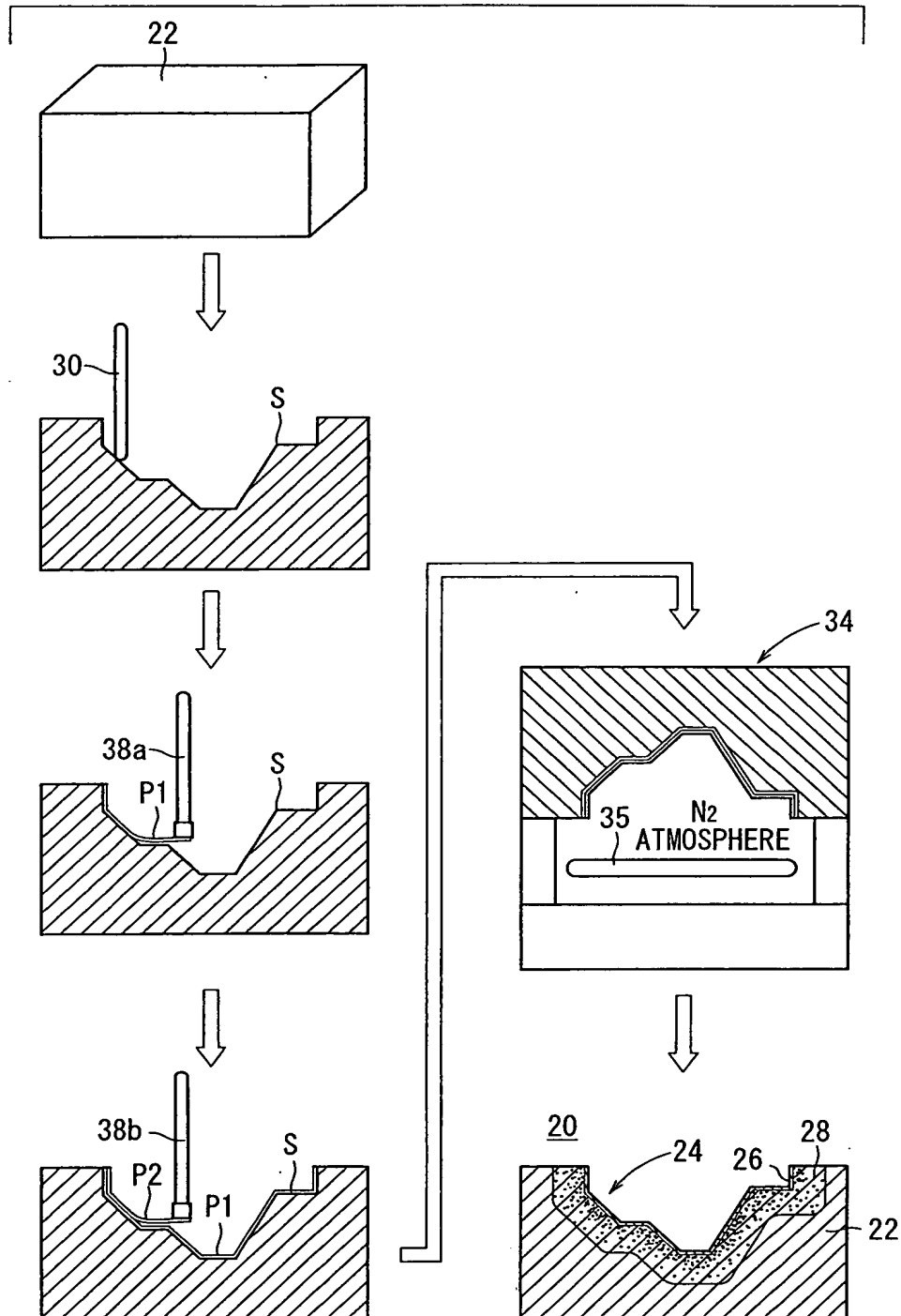




FIG. 9



10/15

FIG. 10

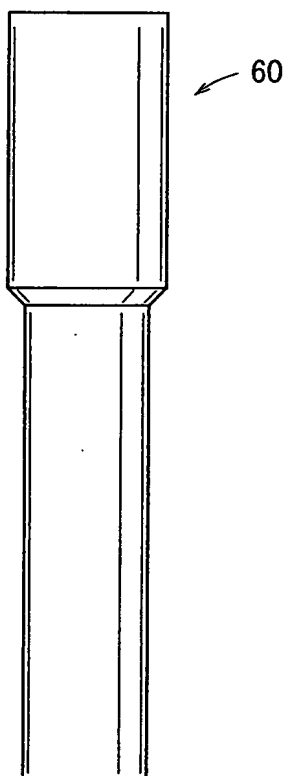


FIG. 11

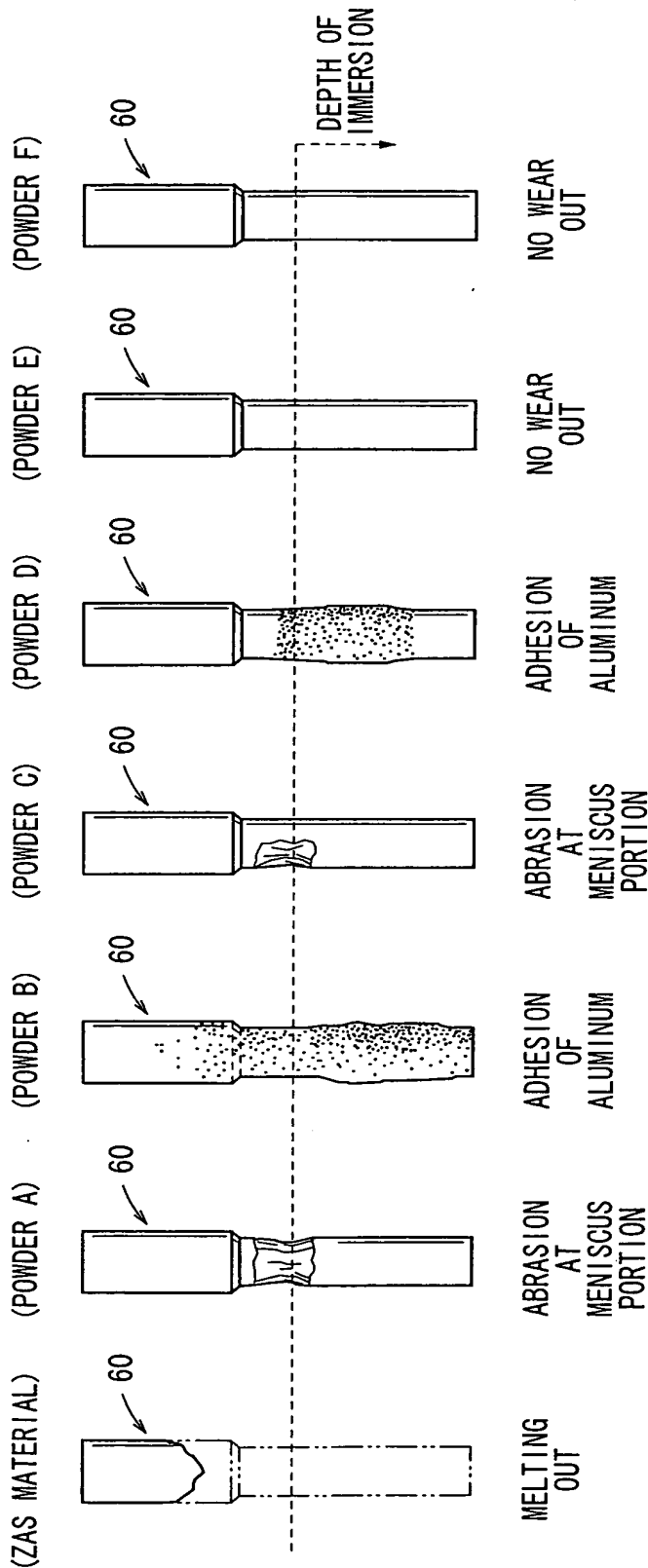


FIG. 12

62

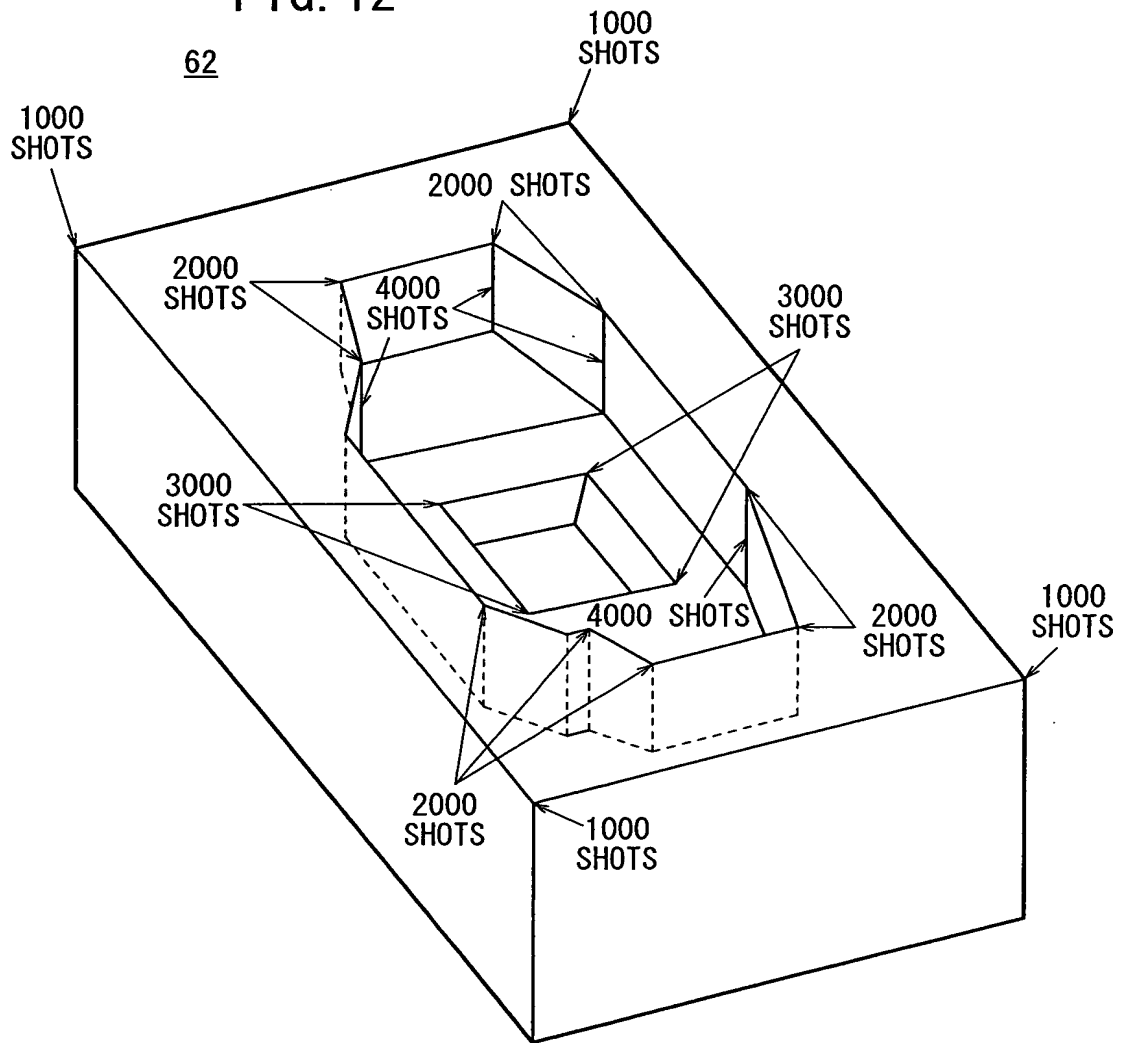
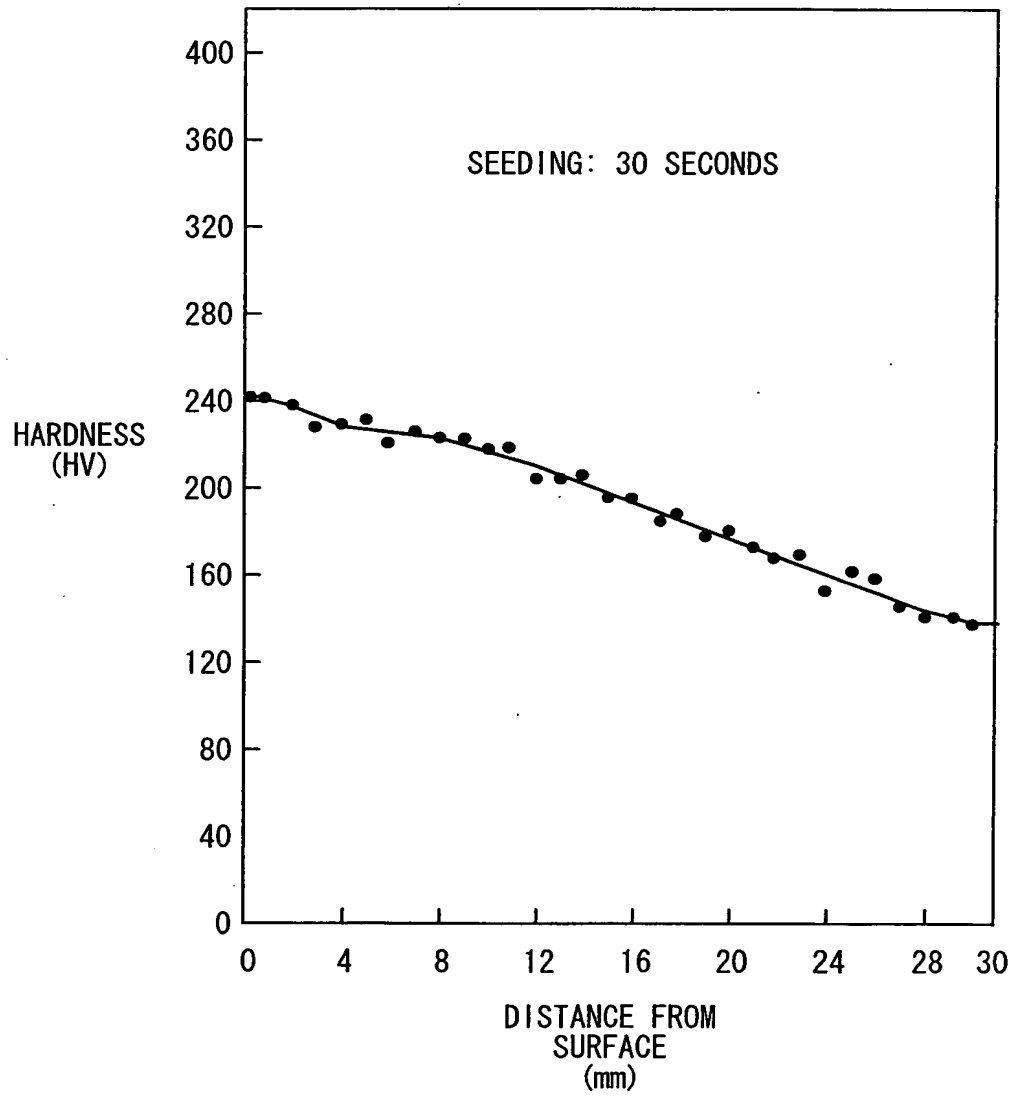


FIG. 13

	SEEDING TIMING (SECOND)				
	1	5	10	30	60
THICKNESS OF MICROSTRUCTURAL CHANGE (mm)	1~3	2~3	5~7	4~10	10~20
CRYSTAL GRAIN SIZE ( $\mu$ m)	40~100	30~50	10~30	20~40	60~80
HARDNESS (HV)	120~135	150~180	230~240	220~240	140~160

14/15

FIG. 14



15/15

FIG. 15

